# QA-PT
# User and Service Manual

## QA-PT Parameter Tester

METRON

P/N 14625
V.1.29

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# *Manual Revision Record*

This record page is for recording revisions to your *QA-PT User and Service Manual* that have been published by METRON AS or its authorized representatives. We recommend that only the management or facility representative authorized to process changes and revisions to publications:

- make the pen changes or insert the revised pages;
- ensure that obsolete pages are withdrawn and either disposed of immediately, or marked as superseded and placed in a superseded document file, and;
- enter the information below reflecting that the revisions have been entered.

| Rev No | Date Entered | Reason | Signature of Person Entering Change |
|---|---|---|---|
| 0 | 2000-02-20 | Initial Release | METRON |
| 1.29-1 | 2001-01-24 | General Update | |
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# 1. Introduction

This chapter describes the METRON QA-PT Parameter Tester's features and specifications.

## 1.1 Features

QA-PT is a compact, lightweight high performance parameter tester designed to be used by trained service technicians for calibration or test of medical and industrial devices.

It is a versatile test instrument, able to measure multiple parameters. Basic parameters cover pressure, vacuum and temperature measurements (Models 1H and 1G).

Gas flow, barometric pressure and humidity measurements are included in the enhanced QA-PT (Models 2H and 2G). QA-PT is menu driven, and simple to operate. All functions are set from a 128 x 32 pixel graphical display.

## 1.2 Specifications

**Pressure Measurement**

**QA-PT Model 1H or 2H:**

| | |
|---|---|
| Operating range: | -350 to +350 mmHg |
| Accuracy: | 0.1% of range |
| Resolution: | 0.1 mmHg |
| Units of measure: | mmHg, mBar, $cmH_2O$, PSI, InHg, $InH_2O$, $kgcm^2$ and kPa |

**QA-PT Model 1G or 2G:**

| | |
|---|---|
| Operating range: | -700 to +5000 mmHg |
| Accuracy: | 0.05% of range |
| Resolution: | 1 mmHg |
| Units of measure: | mmHg, mBar, $cmH_2O$, PSI, InHg, $InH_2O$, $kgcm^2$ and kPa |

**Temperature Measurement**

| | |
|---|---|
| Operating range: | -200 to +750 °C |
| Accuracy: | 1% of reading |
| Resolution: | 0.1 °C and °F |
| Units of measure: | °C and °F |

Use standard external temperature probe type PT-100 or PT-1000 (DIN/IEC 751 Class A) for temperature measurements in °C or °F.

**Temperature Probe Specification:**

**PT-100:**

| | |
|---|---|
| Operating range: | -200 to +750 °C |
| Accuracy: 0.13 °C @ | 100 °C |

| | |
|---|---|
| | 0.1 °C @ 0 °C<br>0.2 °C @ 100 °C |

**PT-1000:**

| | |
|---|---|
| Operating range: | -200 to +750 °C |
| Accuracy: | 0.3 °C |

### Barometric pressure

**QA-PT Model 2G or 2H:**

It is possible to compensate for the sea level and calibrate for offsets.

| | |
|---|---|
| Operating range: | 380 to 900 mmHg |
| Accuracy: | 2 % of reading |
| Resolution: | 1 mmHg |
| Units of measure: | mmHg, mBar, inHg and hPa |

### Temperature Simulation (Optional)

High precision tester module for temperature calibration/verification is optional.

| | |
|---|---|
| Operating range: | 25, 37, 38, 40 and 44°C |
| Accuracy: | 0.025% of reading |
| Standard: | YSI 400 |

### Gas Flow

**QA-PT Model 2G or 2H:**

Measures with an embedded sensor with 11 calibration points to compensate nonlinearity.

Calibration constants stored in firmware.

| | |
|---|---|
| Operating range: | -750 to +750 ml/min |
| Accuracy: | 1% of range or 5% of reading |
| Resolution: | 0.1 ml/min |
| Compatibility: | Gas: Air, N2, $O_2$, $CO_2$, H2 and He |
| Units of measure: | ml/min (or SCCM - Standard Cubic Centimeters per Minute) |

### Relative Humidity

**QA-PT Model 2G or 2H:**

An integrated sensor in the instrument determines relative humidity measurements.

| | |
|---|---|
| Operating range: | 0 to 100% RH |
| Accuracy: | 2% @ 25 °C |
| Resolution: | 1% RH |
| Gas compatibility: | Air |
| Units of measure: | % RH |

## 1.3 General Information

| | |
|---|---|
| **Temperature Requirements:** | +15°C to +35°C when operating<br>0°C to +50°C in storage |
| **Display/Control:** | LCD graphic display, 128 x 32 pixel |
| **Data Input/Outputs (1):** | Bi-directional RS-232C for Computer control |
| **Power:** | 9 Volt Alkaline Battery RG9 or Battery eliminator |
| **Case:** | ABS plastic case |
| **Weight:** | 0.4 kg / 0.9 lbs. with battery |

| | | |
|---|---|---|
| **Dimensions:** | D x W x H:<br>34mm x 94mm x 156mm<br>1.3 in x 3.7 in x 6.1 in | |
| **Part No:** | QA-PT Parameter Tester | |
| | 14600: | QA-PT Model 1H |
| | 14601: | QA-PT Model 1G |
| | 14602: | QA-PT Model 2H |
| | 14603: | QA-PT Model 2G |
| **Standard Accessories:** | 14625: | User-/Service Manual QA-PT |
| | 14620: | High-Impact Plastic Carrying Case |
| | 14621: | Tubing Kit |
| **Optional Accessories:** | 17021: | 230 VAC to 9 VDC Battery Eliminator |
| | | -or- |
| | 17027: | 115 VAC to 9 VDC Battery Eliminator |
| | 14605: | Option - Temperature Simulation |
| | 14611: | PT-100 Temperature Probe |
| | 14612: | PT-1000 Temperature Probe |
| | 14610: | Expansion Chamber |
| | 14622: | Inflation Bulb |

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# 2. Installation

This chapter explains unpacking, receipt inspection and claims, and the general procedures for QA-PT setup.

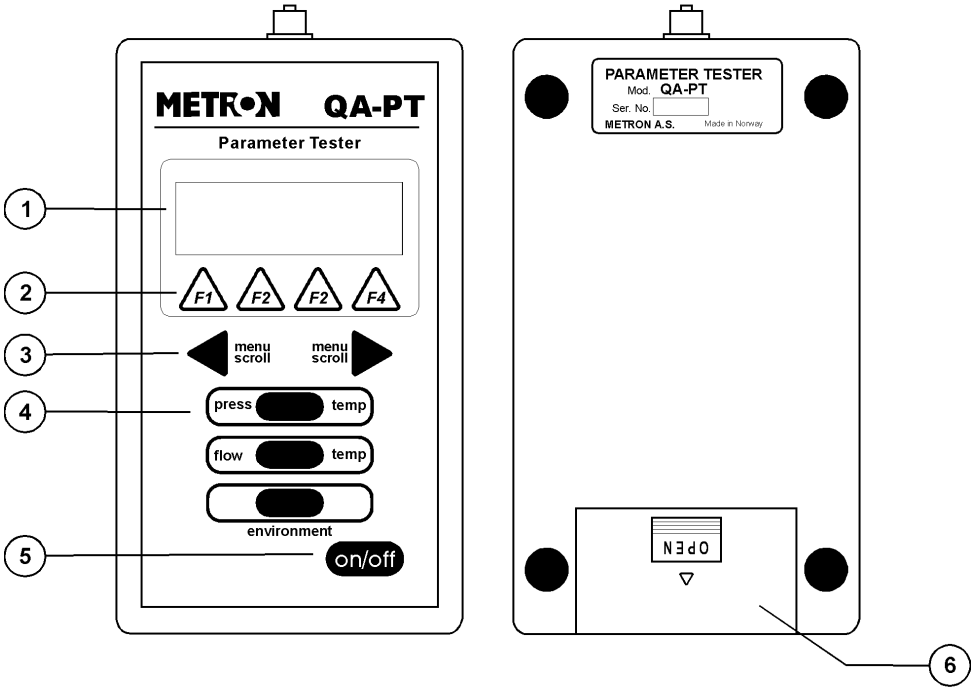
## 2.1 Receipt, Inspection and Return

1. Inspect the outer box for damage.
2. Carefully unpack all items from the box and check to see that you have the following items:
   - QA-PT Parameter Tester (P.N. dependent on model)
   - QA-PT User-/Service Manual (P.N. 14625)
   - Tubing Kit (P.N. 14621)
3. If you note physical damage, or if the unit fails to function according to specification, inform the supplier immediately. When METRON or the company's Sales Agent, is informed, measures will be taken to either repair the unit or dispatch a replacement. The customer will not have to wait for a claim to be investigated by the Sales Agent. The customer should place a new purchase order to ensure delivery.
4. When returning an instrument to METRON, or the Sales Agent, fill out the address label, describe what is wrong with the instrument, and provide the model and serial numbers. If possible, use the original packaging material for return shipping. Otherwise, repack the unit using:
   - a reinforced cardboard box, strong enough to carry the weight of the unit.
   - at least 5 cm of shock-absorbing material around the unit.
   - nonabrasive dust-free material for the other parts.

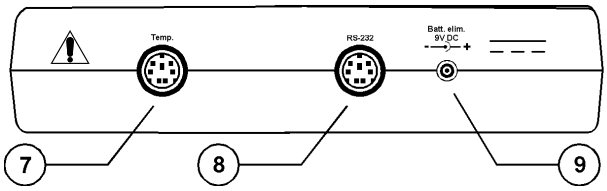
   Repack the unit in a manner to ensure that it cannot shift in the box during shipment.

METRON's product warranty is on page ii of this manual. The warranty does not cover freight charges. C.O.D. will not be accepted without authorization from METRON or its Sales Agent.

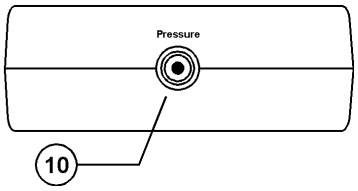
## *QA-PT Front and Back Panels:*




## *QA-PT Left Side Panel:*




## *QA-PT Top Panel:*



# 3. Operating QA-PT

This chapter describes the controls and terminals of the QA-PT Parameter Tester. It also provides basic operating instructions.

## 3.1 Controls and Terminals

### QA-PT Front Panel

| | |
|---|---|
| 1. **LCD Display** | 1.8 cm x 5.8 cm (.7 in. x 2.3 in.) 128 x 32 pixel window displaying messages, test results and function menus. |
| 2. **Function Keys** | Used to select various preset test parameter options, and run the tests. |
| 3. **Menu Scroll Keys** | Used to navigate between and confirm the various preset test parameter options. |
| 4. **Test Keys** | Pressing these opens the relevant test screen: |
| **press / temp** | Pressure / Temperature Test. |
| **With QA-PT Models 2G and 2H the following additional tests can be performed:** | |
| **flow / temp** | Gas Flow / Temperature Test. |
| **environment** | Barometric Pressure / Relative Humidity Test. |
| 5. **On / Off** | Turns the unit on and off. |

### QA-PT Bottom Panel

| | |
|---|---|
| 6. **Battery Compartment** | Compartment for holding a 9 V alkaline battery. |

### QA-PT Left Side Panel

| | |
|---|---|
| 7. **Temp.** | 8-pin mini-DIN plug connector for the temperature cable. Use standard external temperature probe type PT-100 or PT-1000 (DIN/IEC 751 Class A) for temperature measurements in °C or °F. |
| 8. **RS-232** | 8-pin mini-DIN plug for connecting an RS-232. This is used for uploading new firmware, transfer of measuring results, and calibration. You need a customized cable to do this interface. |
| 9. **Battery Elim.** | 2.1 mm micro jack for connecting either a 9 VDC or 9VAC plug-in power supply transformer for use in operating the unit from any standard electrical outlet. The jack polarity is center negative. We recommend you use one of METRON's Battery Eliminators (P.N. 17021 or P.N. 17027), available separately from your METRON Sales Agent. |

### QA-PT Top Panel

| | |
|---|---|
| 10. **Pressure** | Pressure port connector. |

## 3.2 Power

1. The parameter tester uses 9 V alkaline batteries. It is designed to use as much of the battery as possible. When it detects less than about 6.8 V, it , sounds a continuous tone alarm. When it detects less than 6.0 V, it goes into a shutdown mode

NOTE
Remove the batteries and disconnect the Battery Eliminator if you do not intend to use the QA-PT for an extended period of time.

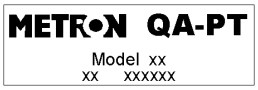
The battery is situated in the base of the instrument. Use 9-volt alkaline batteries (Duracell® MN1604 or equivalent). Do not use mercury, air or carbon-zinc batteries.

2. As an alternative to batteries you can power the tester with a 2.1 mm size plug adapter (for example, METRON's 9 VAC Adapter / Battery Eliminator, P.N. 17021, or 9 VDC Adapter / Battery Eliminator, P.N. 17027). The adapter voltage must not exceed 14.5 volts.

## 3.3 Operating QA-PT

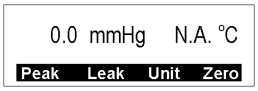
Operating QA-PT is simple. Make whatever required connections that are needed for the desired test. By using the tester's keypad you control the tests.

1. Press the tester **ON**. The LCD window displays the QA-PT model, installed firmware version and the unit's serial number for about two seconds.




The window then displays the pressure / temperature display. This is the default test.

NOTE
When there is a temperature sensor attached to the unit this will be indicated in the display, If not, "NA" will be displayed.




2. Select the ***F1-F4 function keys*** to set the test parameter presets. Use the ***right menu scroll key*** to navigate between the various options. Press the ***F1-F4 function key*** under the desired test preset. Press the ***left menu scroll key*** to confirm to desired preset.

3. **For QA-PT Models 2G and 2H**, press a test key to go to a test screen other than the default pressure / temperature test. After reaching the desired test, select the ***F1-F4 function keys*** to set the test parameter presets. Use the ***right menu scroll key*** to navigate between the various options. Press the ***F1-F4 function key*** under the desired test preset. Press the ***left menu scroll key*** to confirm to desired preset.

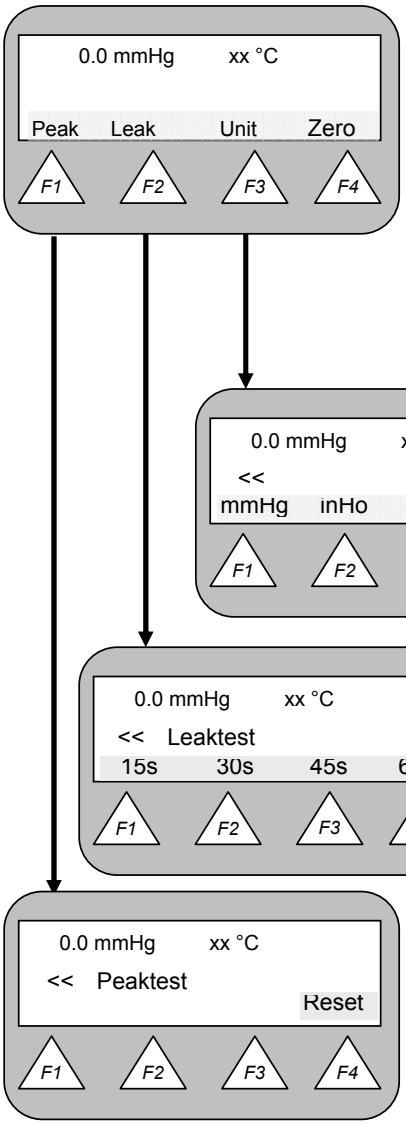
## 3.4 Cleaning the QA-PT

The outside of the instrument may be cleaned using a damp cloth with mild detergent. Please note that some solvents like Methanol may damage the overlay and cabinet.

# 4. Running Tests

This chapter describes QA-PT test procedures by function. If you are unfamiliar with the testers' basic operation, refer to *paragraph 3.3, Operating OA-PT.*

## 4.1 Pressure / Temperature




**Peak (F1)** Peak test will be displayed as long as the measurement is performed. QA-PT will display the highest value of the measurement. The measurement can be reset with the ***F4*** key.

**Leak (F2)** By selecting F1 ->F4 you can set the time for the leak measurement. This interval can be set to 15,30.45 and 60 seconds, and the difference between the start/stop pressure is displayed.

**Unit (F3)** QA-PT can display the result in the following units: mmHg, inHO, mBar, cmHo, kPa, inHg, PSI, Kgcm and C/F. You can convert between them using the menu scroll function.

**Zero(F4)** Resets the pressure measurement. This function should only be used to set zero and not for relative measurements in proportion to a given pressure.

1. Press the ***right menu scroll key*** ► to view the available units of measurement.
2. Select the desired unit by pressing the appropriate ***F1-F4*** key.
3. Press the ***left menu scroll key*** ◄ to confirm the selection.
4. To start the test, pressurize the circuit.
5. Select the desired time for the measurement by pressing the appropriate ***F1-F4*** key. The result then appears after this time expires.
6. Press the ***left menu scroll key*** ◄ to return to th preceding screen.
7. Press the ***left menu scroll key*** ◄ to return to the preceding screen.
8. **Reset** = Resets the measurement in progress to zero.

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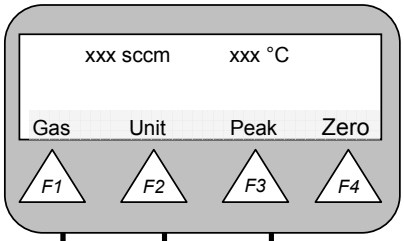
## 4.2 Gas Flow / Temperature (Models 2G and 2H Only)

If you select the flow/temp option, the QA-PT will switch on the power supply for the gas flow sensor(battery save function will not turn the power on for this circuit before it's in use) The sensor will need approx. 1 minute to warm up before the measuring result is accurate.

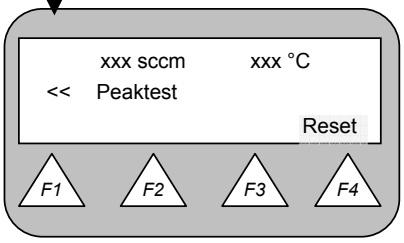



**Gas (F1)** Sets the type of gas you are using for the measurement. **Note:** This parameter must be set right in order to make correct measurements.

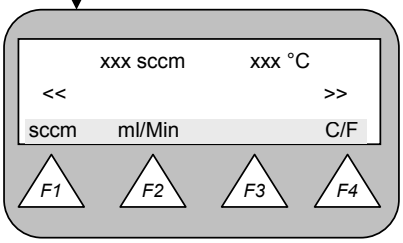
**Unit (F2)** Sets SCCM, ml/min for gas flow and °C/F for the temperature.

**Peak (F3)** Peak test is displayed as long as the measurement is performed. QA-PT displays the measurement's highest value. Reset the measurement with the ***F4*** key.

**Zero (F4)** Resets the pressure measurement. This function should only be used to set zero, and not for relative measurements in proportion to a given pressure.

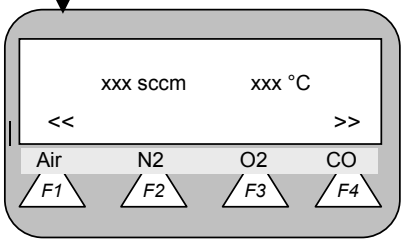



1. Press the ***left menu scroll key*** ◄ to return to the preceding screen.
2. **Reset** = Resets the measurement in pro gress to zero.




7. Select the unit of gas flow with the ***F1*** or ***F2*** keys, and the unit of temperature with the ***F4*** key..
8. Press the ***left menu scroll key*** ◄ to confirm the selection(s).

**Note:** An optional PT100 or PT 1000 temperature probe is necessary for the temperature




5. Press the ***menu scroll keys*** ◄ ► to view the available types of gas.
6. Select the desired type of gas by pressing the appropriate ***F1-F4*** key.
7. Press the ***left menu scroll key*** ◄ to validate the selection

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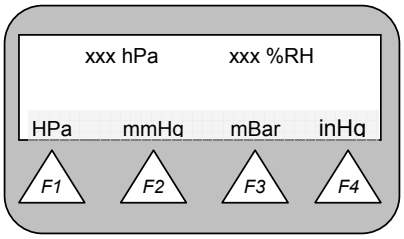
## 4.3 Barometric Pressure and Relative Humidity (Models 2G and 2H Only)

When environment is selected the power supply for the barometric pressure sensor will be switched **ON**. The sensor will need about ten seconds to warm up before the measuring results are reliable.




1. Use the ***F1*** to ***F4*** keys to select the barometric pressure measuring unit. The barometric pressure and the relative humidity are then measured.
2. Return by pressing a test key.

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# 5. Servicing QA-PT

This chapter covers QA-PT maintenance and troubleshooting procedures.

## 5.1 Troubleshooting Procedures

1. **Missing Firmware**

   If the firmware is missing from the flash memory the QA-PT will not respond to the **ON/OFF** button. The unit can be turned on, but the display will be blank.

2. **Voltage Levels**

| Signal | Min[V] | Nominal[V] | Max[V] |
|---|---|---|---|
| VCC | 4.80 | 5.00 | 5.20 |
| V5P | 4.90 | 5.00 | 5.10 |
| V8P | 8.20 | 8.30 | 8.40 |

3. **Current consumption**

   Current consumption depends on which QA-PT mode you are running. The power supply for each section is switched **on/off** according to the selected function. All the values in the following table is calculated from a 9V power supply.

| Function | Min[mA] | Nominal[mA] | Max[mA] |
|---|---|---|---|
| **Pressure** | 8 | 10 | 12 |
| **Flow** | 20 | 22 | 24 |
| **Environment** | 13 | 15 | 17 |

## 5.2 Firmware upload

The first time you upload firmware to the QA-PT you will need to mount a strap on S2. The unit is then turned **on**, and **reset** is selected. The firmware upload program is operated from DOS, and will work only on a PC-compatible computer with Windows95/98 (not compatible with Windows NT).

Power up the while pressing the ***F1*** button. This will erase the new firmware. Connect an RS-232 cable between the QA-PT and the computer's COM1 port, and run the **d.bat** file. The computer will then display instructions on the screen during the upload process.

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# 6. Calibrating QA-PT

## 6.1 General

The first time that you boot the QA-PT there are no default values for the different sensors (apart from the relative humidity and barometric pressure). This means that none of them will give any measuring results. If the specific sensor is not mounted, the QA-PT displays “NA”.

To change the calibration constants you need to access the hidden calibration menu. This is done by selecting ***press/temp***, select **unit** and then press the ***right menu scroll key*** twice. Then, select ***F4***.

## 6.2 Procedures

1. **Pressure**

   **Important! A stable temperature is required to do pressure measurements.**

   Pressure is calibrated on five different values so as to compensate for any linearity problem in the pressure sensor. The offset for temperature is calibrated on two values. These values should be approximately 5°C and 20°C (room temperature and refrigerator temperature). All measurements should be performed without disassembling the unit.

2. **Linearity calibration**

   Turn the unit on and wait for 15 minutes so as to stabilize the temperature.

   Select **unit** in the press/temp menu and press ***right menu scroll key*** twice. Then, press ***F4*** to access the hidden calibration menu. Select ***F1*** for pressure calibration. There are two different calibrations, depending upon the pressure sensor.

   - For the measuring range – 350mmHg -> 350mmHg METRON calibrates on the following values: -300, -100, 0, 100 and 300mmHg.
   - For the measuring range –750mmHg -> 5000mmHg we have the following calibration values: -500, -100, 0, 500 and 3000mmHg.

3. **Offset Temperature Calibration**

   Immediately after calibrating the linearity you must calibrate the offset temperature. This is done by pressing the ***right menu scroll key*** while you’re in the pressure calibration menu. Select **HiT** (High Temperature, ***F2***). Then, press ***F4*** to calibrate room temperature. **LowT** (Low Temperature, ***F1***) is calibrated by placing the unit inside of a refrigerator. When the unit has reached a stable temperature, press ***F4*** to calibrate.

The pressure is now calibrated. Make sure that the unit displays 0 mmHg with different temperatures.

4. **Temperature**

   QA-PT is calibrated on 0°C and 100°C for both the PT-100 and the PT-1000 sensors.

   Access the calibration menu and select ***F2*** for temperature calibration. Connect the calibration resistors and calibrate on 0°C and 100°C. Calibration resistor specifications are listed in the following table.

| Sensor | 0˚C | 100˚C |
|---|---|---|
| PT-100 | 100 Ohm | 138.5 Ohm |
| PT-1000 | 1000 Ohm | 1385 Ohm |

   These values are used on both sensors, with the alpha value being 0.00385. If another sensor is used, this resistor values would change.

5. **Relative Humidity**

   Offset calibration is done by selecting the ***right menu scroll key*** and pressing ***F1*** (**Humi**) in the calibration menu, and adjusting the displayed value in accordance with the relative humidity. ***F3*** will set the step size for ***F1*** and ***F2***. When the right value is set, select ***F4*** to calibrate.

   If the RH% is not calibrated you should use the standard values.

6. **Barometric pressure**

   Offset calibration is done by selecting the ***right menu scroll key*** and ***F3*** (**Baro**) in the calibration menu, and adjusting the displayed value in accordance with the barometric pressure. ***F3*** will set the step size for ***F1*** and ***F2***. When the right value is set, select ***F4*** to calibrate.

   If the Barometric pressure is not calibrated you should use the standard values.

NOTE
All flow values must be calibrated because QA-PT will calculate a curve from these results. Verify some of the values in between the calibration values to ensure that values are correct.

7. **Gas Flow**

   Gas flow is calibrated on eleven different flow values ( -1000, -500, -250, -100, -50, 0, 50, 100, 250, 500, and 1000). To calibrate, access the calibration menu and select ***F4*** (**flow**). Select the flow value with ***F1***, ***F2*** and calibrate with ***F4***.

# 7. Component Functions and Parts

This chapter provides a description of the functions of the main components of the QA-PT, as well as a parts list for cross-reference.

## 7.1 System Overview

The QA-PT consists of four main modules: a central processing unit, a communications module, a power supply and an analog module. It has functions for temperature correction of measuring values, linearity correction, leakage test, peak detection, high-pressure alarm, battery watchdog and user-defined measuring units. There are two different versions of the QA-PT, depending upon which Motorola MPX-series pressure transducer, or sensor is mounted in the unit.

QA-PT has a 32 x 132-pixel display, and is operated by the soft keys in the top panel. Measured values are shown in the display, as well as sent to an RS232C serial connector. This serial connector allows the QA-PT to interface with a computer, and be operated remotely.

Since the QA-PT's firmware is stored in its flash memory, it can be upgraded from a computer. The latest firmware version can be downloaded from the Metron's Website. Calibration adjustments are done through software and the calibration constants are saved in an EPROM.

## 7.2 QA-PT Hardware

Refer to Appendix A, which contains nine schematic diagrams. Seven of these diagrams refer to the QA-PT itself, while the remaining two describe the RS-232 cable and PT-100/PT-1000 temperature cable pin outs, and temperature calibration pin outs.

1. **Central Processing Unit**. *(Refer to Specification Drawing QA-PT CPU, page A-3).* The QA-PT is built around a Motorola HC11F1 CPU, with a clock frequency of 2 MHz. The addressing range is divided into two, 32-kilobyte blocks. One is used for program, or "flash" memory, and the other is dedicated to SRAM and I/O. QA-PT is always started in a special bootstrap mode, with RXD and TXD short-circuited. This short-circuit starts the EEPROM program (bootload). The program will detect if the **F1** key is pressed. If **F1** is not active, the short circuit switch will be opened, and the startup sequence is finished. If **F1** is active, the firmware upload is triggered.

2. **Display**. QA-PT has a 122 x 32 pixel graphical display. It is connected to both the address and data bus, J5. The refresh clock is actuated through a 555 timer, U23. The negative supply voltage for the contrast is obtained from the RS-232 transceiver, U19.

3. **Analog Module**. *(Refer to Specification Drawings QA-PT Analog, page A-5; QA-PT Temperature and Flow, page A-6, and; QA-PT Pressure and Barometer, page A-7).* QA-PT is designed with a reference voltage that is used to supply the Motorola MPX-series pressure transducer. This is to prevent any deviation in the trans-

ducer that could affect the measurements. The analog part is based on a Burr-Brown 24-bit differential A/D converter with an SPI interface to the CPU, ADS1213U, and U13. The A/D converter has a built in 4:1 analog multiplexer. The attached sensor will measure in cycles, dependent upon the measuring mode. The A/D converter is also used for relative humidity, internal temperature and battery voltage.

The 2.5 V reference voltage is generated in the differential instrumentation amplifier, INA125, U12. The reference voltage supplies a Motorola MPX-series pressure sensor (U8) that is connected to U12. For QA-PT Models 1H and 2H the Motorola pressure sensor is the MPX7050 GP, while for Models 1G and 2G the sensor is the MPX2700 GP. Different pressure sensors can be used for the different measuring ranges.

An absolute pressure sensor (Motorola MPX2200A, U6) is used to measure the barometric pressure. The supply voltage for this device is only connected when this is required. The signal amplifier is an Analog Devices AD623AR, U9.

**In QA-PT Models 2G and 2H Only**. Relative humidity is measured with the Honeywell sensor HIH-3605-B, U1. This sensor has an integrated amplifier that is connected to the A/D on the CPU. Additionally, gas flow is measured with another Honeywell sensor with an integrated amplifier, the AWM3303V, U17. The power supply is connected only when required.

4. **Power supply**. *(Refer to Specification Drawing QA-PT Power Supplies, page A-8).* The QA-PT uses a 9V battery, or a 7-10V net adapter. The maximum current consumption is less than 30 mA (9V). VCC is generated with a step down switch mode converter, MAX639CSA, U24.

   The unit is switched ON by setting the shut down signal on U24 HIGH. The unit is switched OFF by setting the signal LOW (this is controlled by the firmware).

   The analog supply voltages are generated by using a capacitive spennings dobler, LM2660MM, U11 on the VCC signal. Analog 5VDC (V5P) is generated with a 5.0VDC low dropout linear regulator, LP2982AIM5, U2.

   The analog 8.3VDC (V8P) is generated with a 3.3VDC low dropout linear regulator, LP2982AIM33, U10 with reference to V5P.

## *Appendix A - Schematic Diagrams*

QA-PT ..... A-2

QA-PT CPU ..... A-3

QA-PT Communication ..... A-4

QA-PT Analog ..... A-5

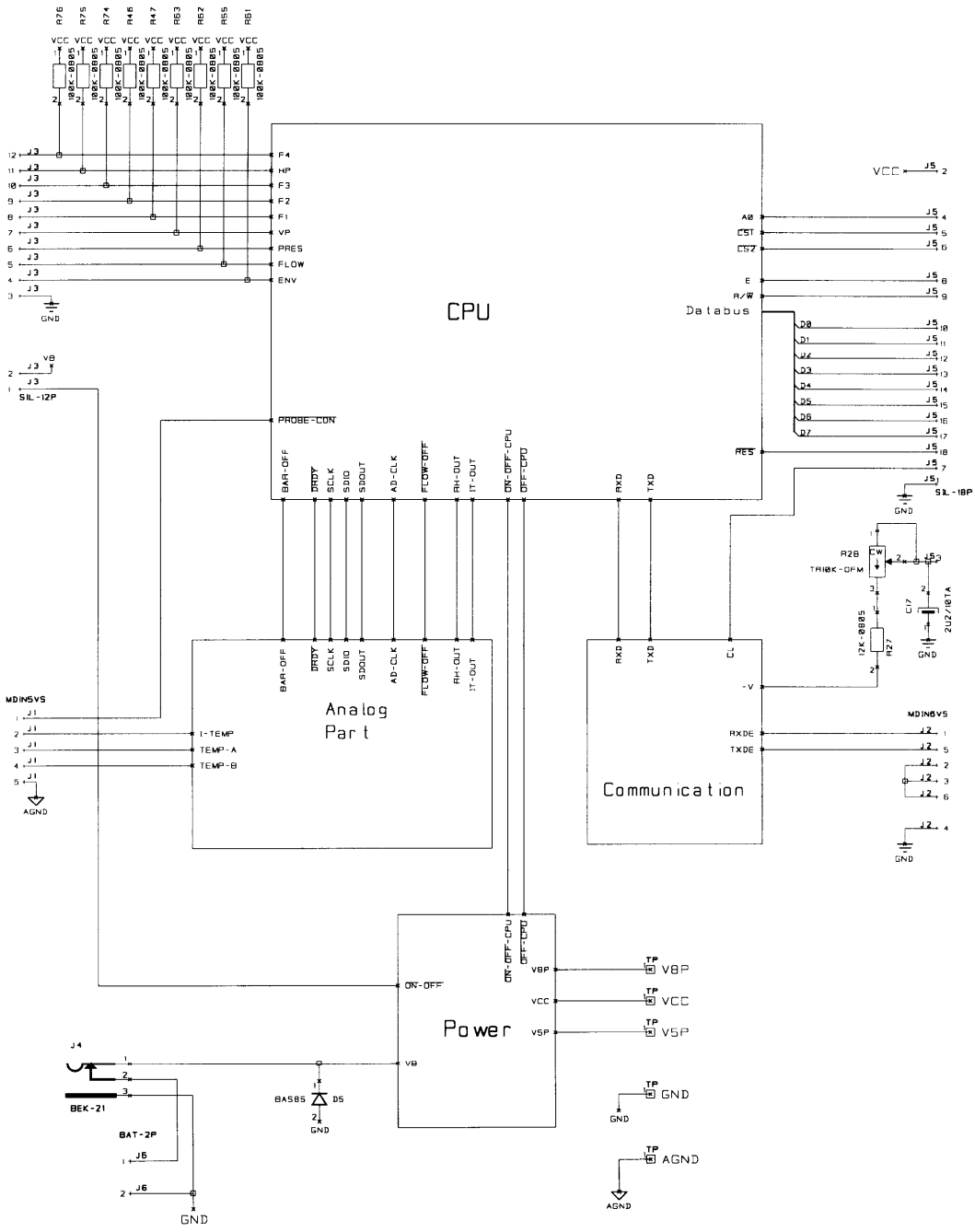
QA-PT Temperature and Flow ..... A-6

QA-PT Pressure and Barometer ..... A-7

QA-PT Power Supplies ..... A-8

QA-PT Cables ..... A-9

QA-PT Temperature Calibration ..... A-10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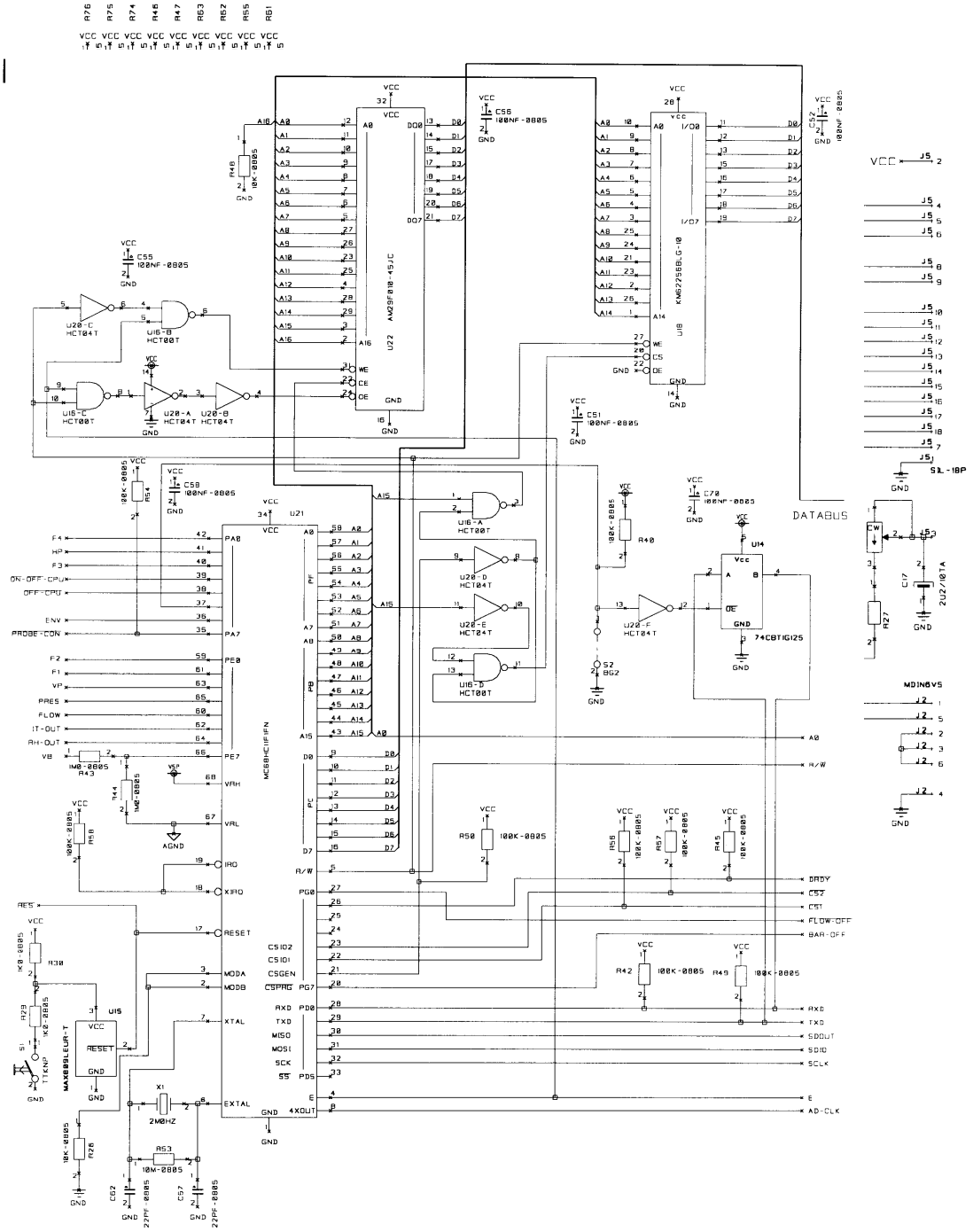
Databus
Analog
Part
Communication
Power
PROBE-CON
SIL-12P
SIL-18P
MDIN5VS
MDIN6VS
BAT-2P
BEK-21
BAS85
GND
AGND
VCC
V8P
V5P
ON-OFF
BAR-OFF
DRDY
SCLK
SDIO
SDOUT
AD-CLK
FLOW-OFF
AH-OUT
IT-OUT
ON-OFF-CPU
OFF-CPU
RXD
TXD
RXDE
TXDE
T-TEMP
TEMP-A
TEMP-B
F4
HP
F3
F2
F1
VP
PRES
FLOW
ENV
A0
CS1
CS2
E
R/W
RES
D0
D1
D2
D3
D4
D5
D6
D7
R28
TR10K-OFM
R27
12K-0805
C17
2U2/10TA

**QA-PT CPU**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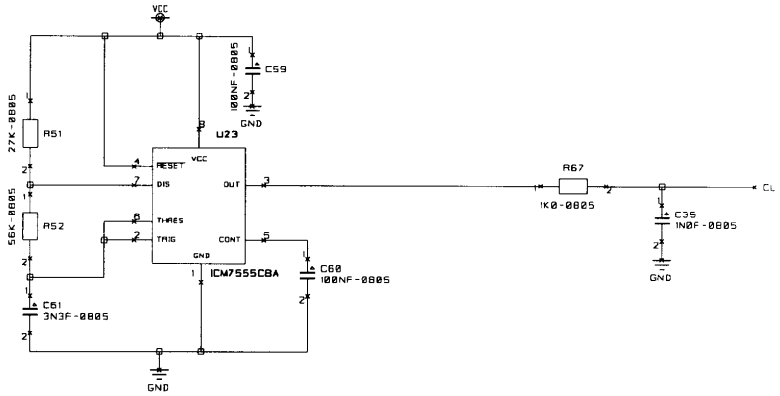
MDIN6VS
SIL-18P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C59
100NF-0805
GND
27K-0805
R51
U23
RESET
VCC
DIS
OUT
THRES
TRIG
CONT
GND
ICM7555CBA
56K-0805
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3N3F-0805
C60
100NF-0805
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1K0-0805
C35
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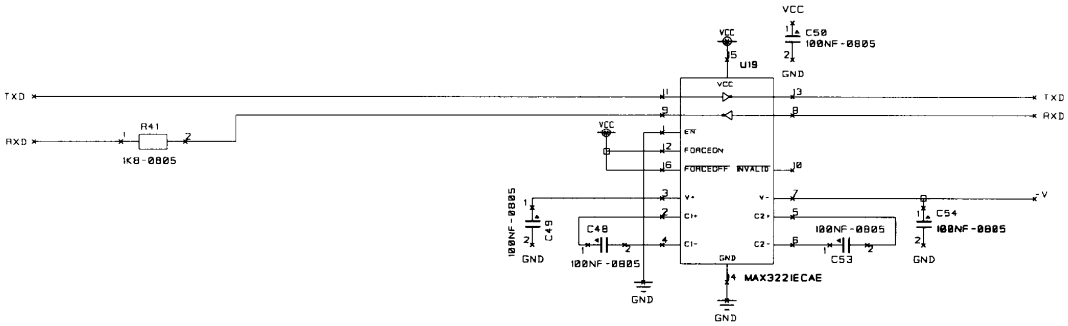
CL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GND
U19
TXD
RXD
R41
1K8-0805
EN
FORCEON
FORCEOFF
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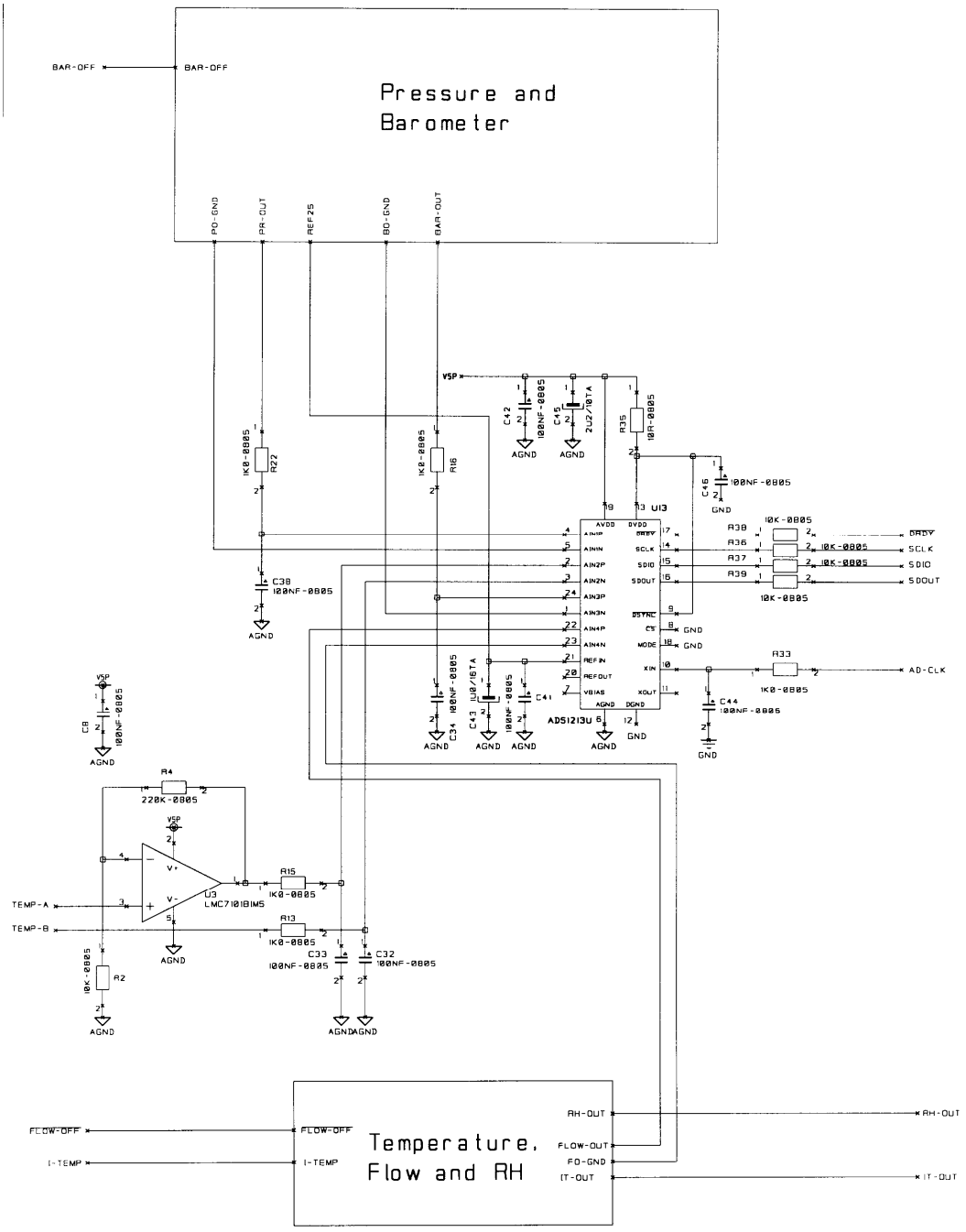
V+
V-
C1+
C1-
C2+
C2-
C49
100NF-0805
C48
100NF-0805
C53
100NF-0805
C54
100NF-0805
MAX3221ECAE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BAR-OFF
Pressure and
Barometer
PO-GND
PR-OUT
REF25
BO-GND
BAR-OUT
VSP
C42
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C45
2U2/10TA
R35
10R-0805
AGND
C46
100NF-0805
GND
U13
AD5121BU
AVDD
DVDD
AIN1N
AIN1P
AIN2N
AIN2P
AIN3N
AIN3P
AIN4N
AIN4P
REFIN
REFOUT
VBIAS
SCLK
SDIO
SDOUT
DSYNC
CS
MODE
XIN
XOUT
AGND
DGND
R22
1K0-0805
R18
1K0-0805
C38
100NF-0805
R38
10K-0805
R36
10K-0805
R37
10K-0805
R39
10K-0805
RDY
SCLK
SDIO
SDOUT
R33
1K0-0805
AD-CLK
C44
100NF-0805
C34
100NF-0805
C43
1U0/16TA
C41
100NF-0805
C8
100NF-0805
R4
220K-0805
R15
1K0-0805
R13
1K0-0805
C33
100NF-0805
C32
100NF-0805
U3
LMC7101BIM5
TEMP-A
TEMP-B
R2
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Flow and RH
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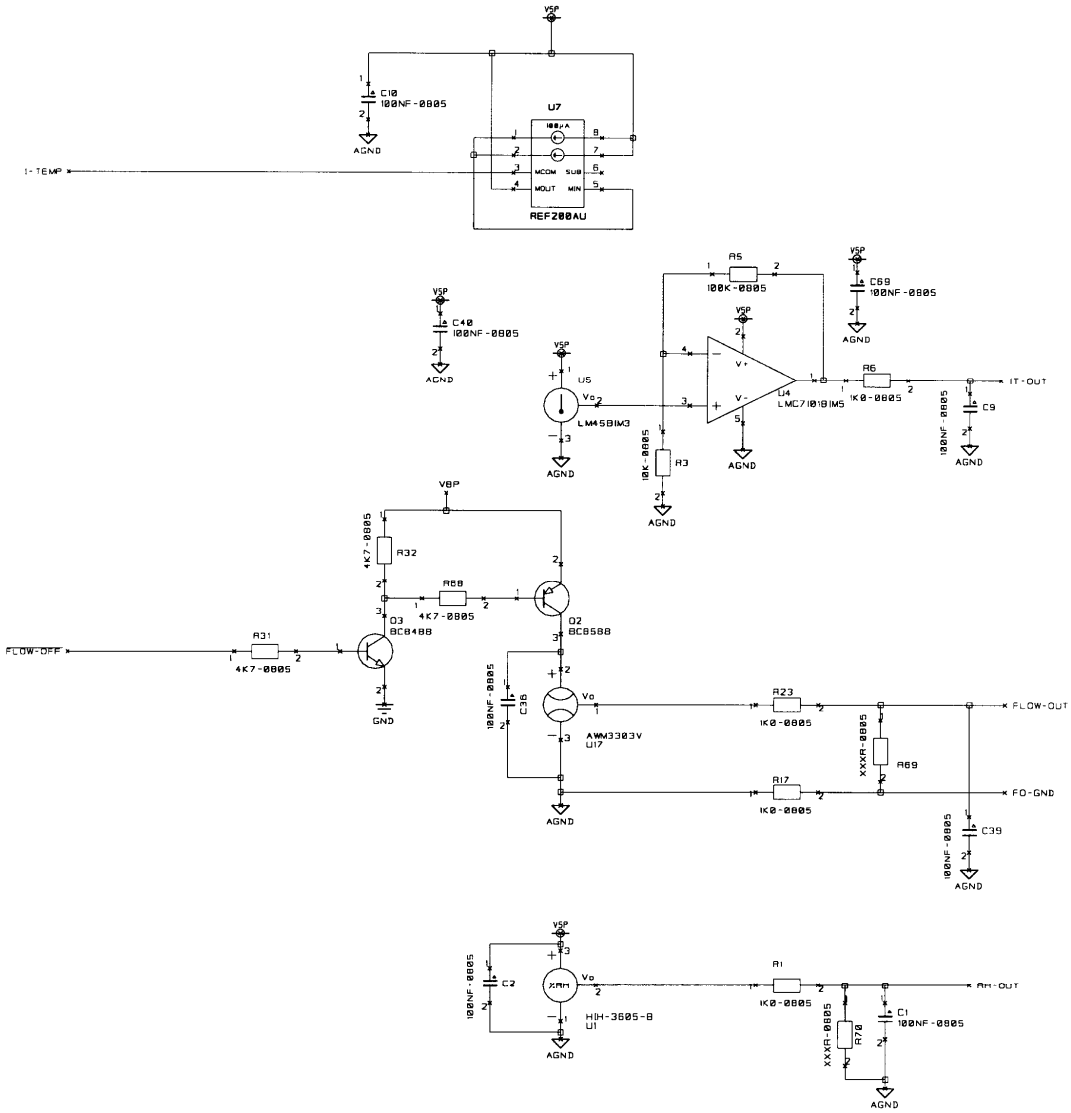
FLOW-OUT
FO-GND
IT-OUT
RH-OUT
IT-OUT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VBP
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4K7-0805
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Q2
BC858B
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GND
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AWM3303V
U17
R23
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FO-GND
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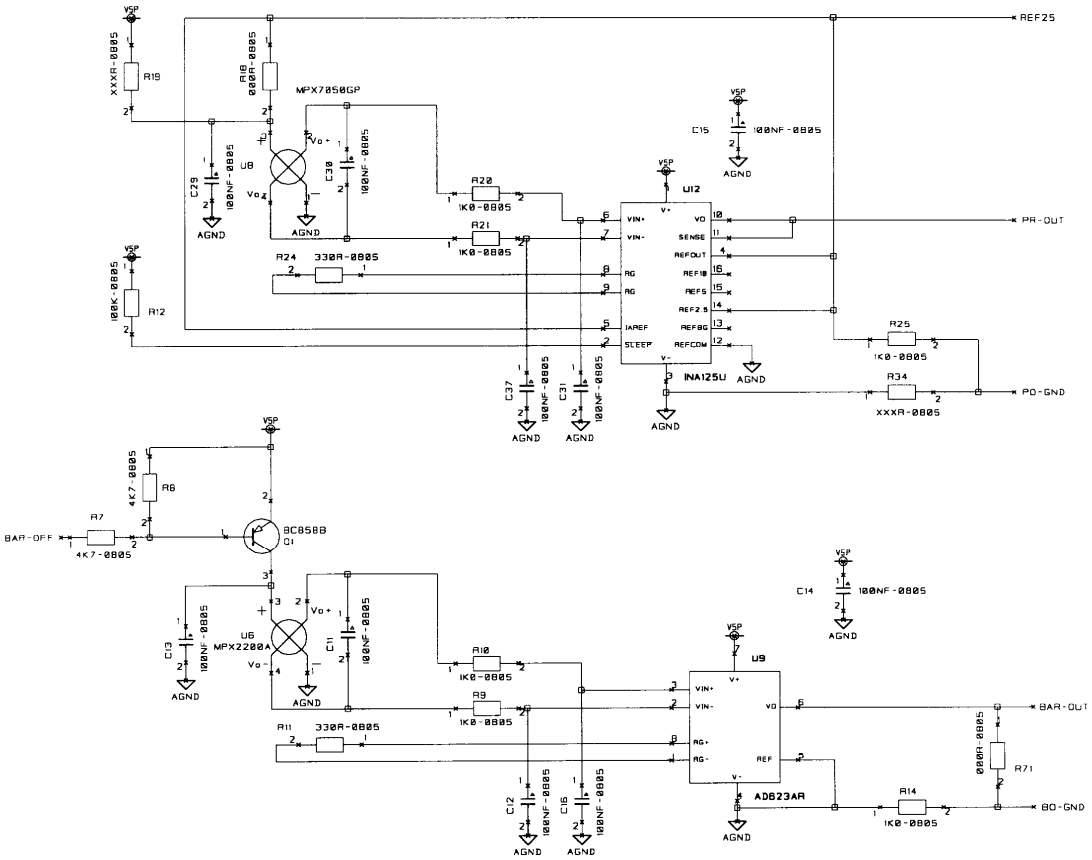
U1
R1
AM-OUT
C1
R70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1K0-0805
R21
1K0-0805
R24
330R-0805
R12
100K-0805
C15
100NF-0805
U12
INA125U
VIN+
VIN-
RG
RG
IAREF
SLEEP
VO
SENSE
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REF10
REF5
REF2.5
REFBG
REFCOM
V+
V-
REF25
PR-OUT
R25
1K0-0805
R34
XXXR-0805
PD-GND
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U6
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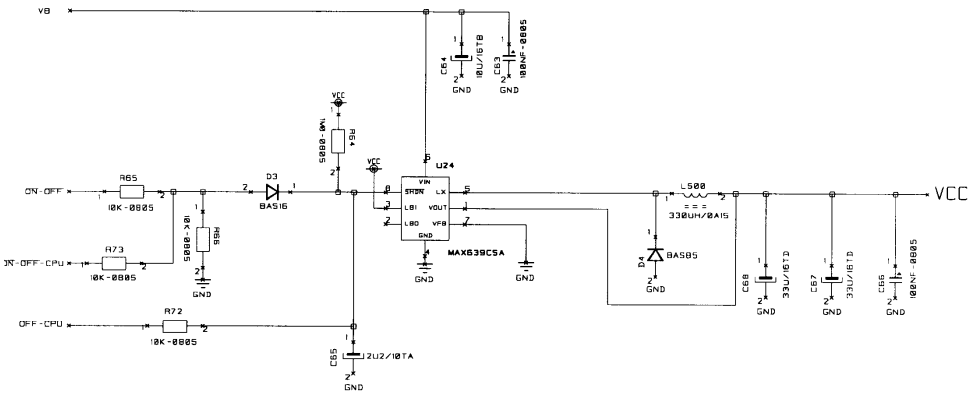
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C63
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GND
VCC
R64
5000-0W1
U24
ON-OFF
R65
10K-0805
D3
BAS16
R66
5000-10K
ON-OFF-CPU
R73
10K-0805
OFF-CPU
R72
10K-0805
MAX639CSA
L500
330UH/0A15
D4
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VCC
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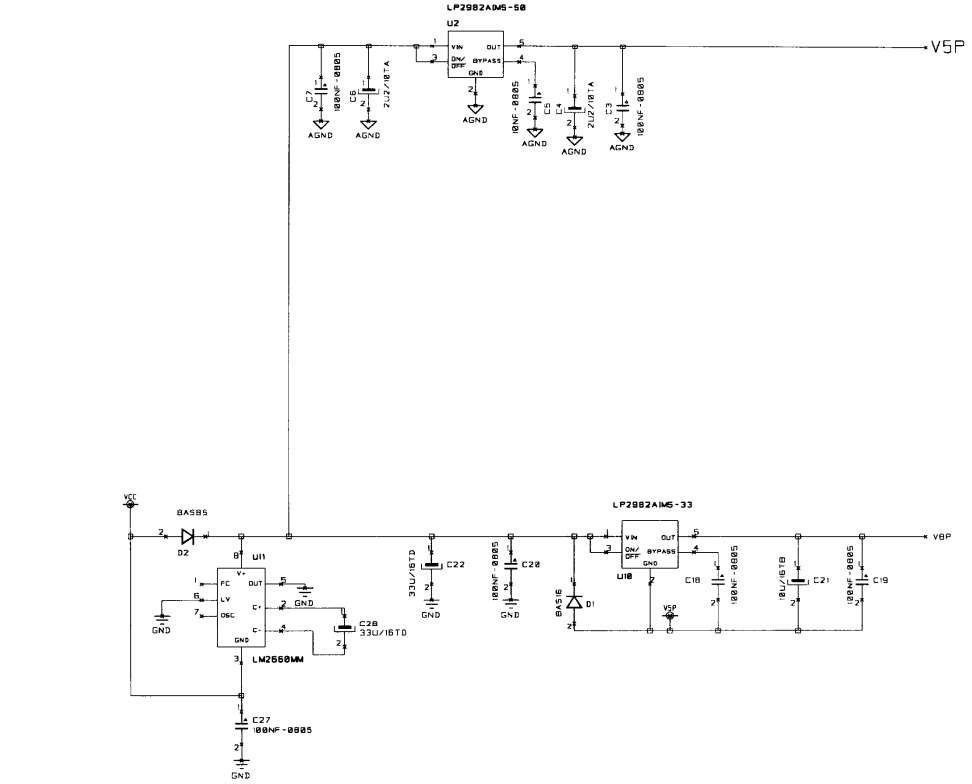
2U2/10TA


LP2982AIM5-50
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V5P
C7
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C6
2U2/10TA
C5
100NF-0805
C4
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C3
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LP2982AIM5-33
U18
BAS16
D1
C18
100NF-0805
C21
10U/16TB
C19
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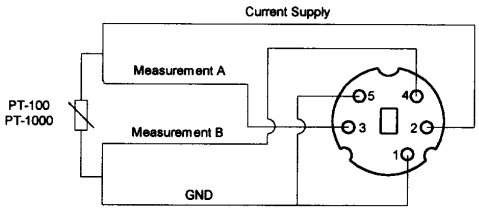
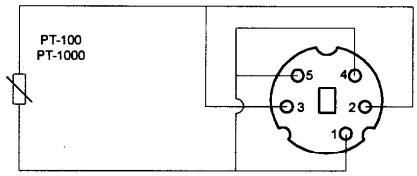
V8P
GND

**Note: Cable: 3-conductorsx+shield. Shield should be connected to chassis on D-Sub.**




5-p Mini-DIN male

4-wire connection

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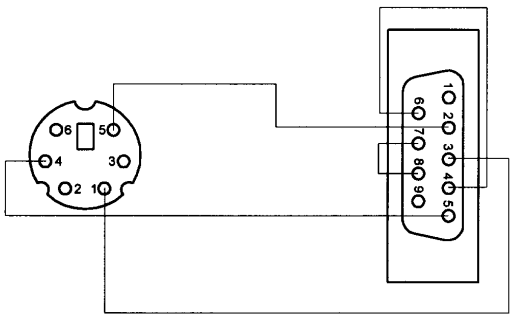
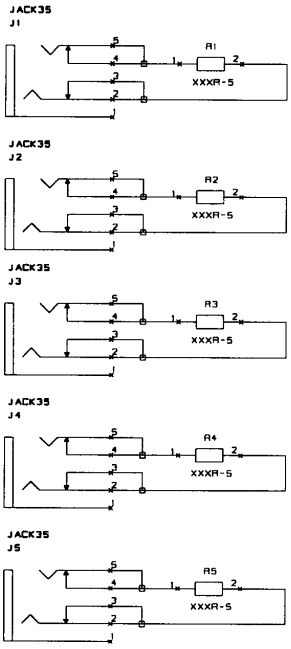
2-wire connection




6-p Mini-DIN male

9-p D-SUB female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R1
XXXR-5
JACK35
J2
R2
XXXR-5
JACK35
J3
R3
XXXR-5
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J4
R4
XXXR-5
JACK35
J5
R5
XXXR-5

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N-7044 Trondheim, Norway
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Fax: (+47) 7391 7009
E-mail: *support@metron.no*

METRON

From: (name) ----------
Address: ----------
---------- Phone: ----------
Fax: ----------
E-mail: ----------
Date:

# *Error Report*

Product: Version: Serial no.:

Description of the situation prior to the error:

Description of the error:

(METRON AS internally)

Comments:

| Received date: | Correction date: | Ref No. | Critical | Normal | Minor |
|---|---|---|---|---|---|

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N-7044 Trondheim, Norway
Phone: (+47) 7382 8500
Fax: (+47) 7391 7009
E-mail: *support@metron.no*

METRON

From: (name) _____ Phone: _____
Address: _____ Fax: _____
_____ E-mail: _____
_____ Date: _____

# *Improvement Suggestion*

Product: _____ Version: _____

Description of the suggested improvement:

(METRON AS internally)

Comments:

| Received date: | Correction date: | Ref No. | Critical | Normal | Minor |
|---|---|---|---|---|---|

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Fax: (+47) 7391 7009
E-mail: *support@metron.no*